CLAIMS

1. A process for manufacturing a thick-film circuit on a titanium or titanium-alloy substrate including firing a glassy dielectric layer upon at least one surface of said substrate.

2. A process as claimed in claim 1 wherein said thick-film circuit includes a hybrid circuit.

3. A process, as claimed in claim 1 including diffusing lead through titanium oxides on the or each surface of said substrate to form a relatively strong bond between said substrate and the dielectric layer immediately adjacent to it.

4. A process as claimed in claim 1 including firing additional layers of similar or different dielectric material on top of the dielectric layer immediately adjacent said substrate.

5. A process as claimed in claim 1 including selecting materials and layer-thicknesses according to their temperature coefficients of expansion and Young's modulus to control bending of said substrate.

6. A process as claimed in claim 1 including placing a layer of dielectric material on a reverse side of said substrate to inhibit growth of oxide during said firing.

7. A process as claimed in claim 6, including removing the dielectric layer placed on the reverse side after at least some of the firing is complete.

8. A process as claimed in claim 6, including leaving in place the dielectric layer placed on the reverse side after the firing is complete.

9. A process, as claimed in claim 1 including modifying temperatures of firing of various layers to control bending of said thick-film circuit.

10. A process, as claimed in claim 1 including arranging dielectric layers upon which one or more elements of said circuit is printed on said substrate, including layers that are or may be printed on top of the or each element, to control temperature coefficient of resistivity of the or each element.

11. A process as claimed in claim 10 wherein the or each element includes one or more of a resistor, thermistor and a strain gauge.

12. A process, as claimed in claim 1 wherein said thick-film circuit includes a strain gauge, including adjusting proportions of different dielectric inks, and mixing the inks together before firing same to produce a layer or layers upon which said strain-gauge is printed and fired to control temperature coefficient of resistivity of said strain gauge.

13. A thick-film circuit including a titanium or titanium-alloy substrate having a glassy dielectric layer fired upon at least one surface of said substrate.

14. A circuit as claimed in claim 13 wherein said thick-film circuit includes a hybrid circuit.

15. A circuit as claimed in claim 13 including a diffusion of lead through titanium oxides on the or each surface of said substrate to form a relatively strong bond between said substrate and the dielectric layer immediately adjacent to it.

16. A circuit as claimed in claim 13 wherein additional layers of similar or different dielectric material are fired on top of the dielectric layer immediately adjacent said substrate.

17. A circuit as claimed in claim 13 wherein bending experienced by said substrate is controlled by selecting materials and layer-thicknesses according to their temperature coefficients of expansion and Young's modulus.

18. A circuit as claimed in claim 13 wherein a layer of dielectric material is placed on a reverse side of said substrate to inhibit growth of oxide during firing of said glassy dielectric layer.

19. A circuit as claimed in claim 18, wherein the layer of dielectric material placed on the reverse side of said substrate is removed after at least some of the firing is complete.

20. A circuit as claimed in claim 18 wherein the layer of dielectric material placed on the reverse side of said substrate is left in place after the firing is complete.

21. A circuit as claimed in claim 13 wherein bending of said circuit is controlled by modifying firing temperatures of various layers.

22. A circuit as claimed in claim 13 wherein temperature coefficient of resistivity of one or more elements of said circuit printed on said substrate is controlled by arranging dielectric layers upon which the or each element is printed, including layers that are or may be printed on top of the or each element.

23. A circuit as claimed in claim 22 wherein the or each element includes one or more of a resistor, thermistor and a strain gauge.

24. A circuit, as claimed in claim 13 including a strain gauge wherein temperature coefficient of resistivity of said strain gauge is controlled by adjusting proportions of different dielectric inks, said inks being mixed together before firing same and used to produce the layer or layers upon which said strain-gauge is printed and fired.